

Information Disclosure Statement

Attached is an Information Disclosure Statement citing additional art and the required fee. Applicants respectfully request that the Examiner consider this art and return an initialed copy of the Information Disclosure Citation form attached to the Information Disclosure Statement.

Allowable subject matter

Applicants gratefully acknowledge the allowance of Claims 13, 14/13, 17/13, 18/13, 19/13, and 21/13.

Applicants also gratefully acknowledge the indication that:

Claims 4/1, 4/2, 5/1, 5/2, 14/12, 47/43, 48/43, 75/72, 75/73, 76/72, and 76/73 are objected to as being dependent upon a rejected base claim, but would be allowed if rewritten in independent form including all of the limitations of the base claim and any intervening claims;

Claims 25/22, 25/23, 26/22, 26/23, 35/33, 38/33, 39/33, 40/33, 47/44, 48/44, 60/56, 60/58, 61/56, 61/58, 62/61/56, 62/61/58, 63/56, 63/58, 64/56, 64/58, 65/56, 65/58, 66/56, 66/58, 70/67, 70/68, 71/67, 71/68, 81/77, and 82/77 would be allowed if rewritten to overcome the rejection under 35 U.S.C. § 112, second paragraph, as discussed below, and to include all the limitations of the base claim and any intervening claims; and

Claims 15, 16, 17/15, 17/16, 18/15, 18/16, 19/15, 19/16, 20/15, 20/16, 34-37, 38/34, 38/36, 38/37, 39/34, 39/36, 39/37, 40/34, 40/36, 40/37, 41/34, 41/36, 41/37, 42/34, 49, 50, 51/49, 51/50, 52/49, 52/50, 53/49, 53/50, 54/49, 54/50, 57, 59, 60/57, 60/59, 61/57, 61/59, 62/61/57, 62/61/59, 63/57, 63/59, 64/57, 64/59, 65/57, 65/59, 66/57, 66/59, 81/78, and 82/78 would be allowed if rewritten or amended to overcome the rejection under 35 U.S.C. § 112, second paragraph, as set forth in the Office Action and as discussed below.

In response, Applicants have amended a number of claims to overcome the rejection under 35 U.S.C. § 112, second paragraph, but Applicants have not redrafted the allowable

dependent claims in independent form because the independent claims from which they depend are believed to be allowable for the reasons discussed below.

Drawing objection

The drawings are objected to because the following feature is not shown in the drawings: the length of the first electrode measured in a direction crossing with a longitudinal direction of the developing member is longer than the second electrode, as recited in Claims 4, 25, 47, 70, 74, and 81.

In response, while not conceding the propriety of the objection, Claims 4, 25, 47, 70, 74, and 81 have been canceled without prejudice, thereby obviating the objection.

Abstract objection

The Abstract is objected to as too lengthy. In response, Applicants have amended the Abstract to be less than 150 words.

Title objection

The Examiner objects to the title and requests a new title that is more clearly indicative of the invention to which the claims are directed. In response, while not conceding the propriety of the objection, Applicants have supplied a new title that is even more clearly indicative of the invention to which the claims are directed.

Formal claim rejection

Claims 3, 6-11, 15, 16, 17/15, 17/16, 18/15, 18/16, 19/13, 19/15, 19/16, 20/15, 20/16/15, 21-42, 44, 45/44, 46/43, 46/44, 47/44, 48/44, 49, 50, 51/49, 51/50, 52/49, 52/50, 53/49, 53/50, 54/49, 54/50, 55/44, 56-71, 74, 77, and 79-82 are rejected under 35 U.S.C. § 112, second paragraph, for minor informalities in Claim 3, 6, 15, 19, 22, 24, 27, 29, 33, 34, 36, 38/33, 39/33,

63/58

44, 46, 49, 50, 56, 57, 58, 59, 61/56, 61/58, 63/56, 64/56, 64/58, 66/56, 66/58, 67, 69, 74, 77, 78, and 80. In response, while not conceding the propriety of the rejection, Claims 33, 56, 58, 67, 69, 74, 77, 78, and 80 have been canceled without prejudice and Claims 3, 6, 15, 19, 22, 24, 27, 29, 34, 36, 38, 39, 44, 46, 49, 50, 57, 59, 61, 63, 64, and 66, have been amended to address the points raised by the Examiner. Applicants submit that as amended, these claims now even more clearly satisfy 35 U.S.C. § 112, second paragraph.

Substantive rejections

Claims 12, 33, 56, and 58 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,923,918 (Nakagawa, et al.) Claims 1-3, 6-10, 11/1, 11/2, 11/6, 11/7, 21/1, 21/6, 22-24, 27-31, 32/22, 32/23, 32/27, 32/28, 42/22, 42/27, 43, 44, 45/43, 45/44, 46/43, 46/44, 55/43, 55/44, 67-69, 72-74, and 77-80 are rejected under 35 U.S.C. § 102(a) as being anticipated by European Patent No. 1 016 939 A2 (Karakama, et al.).

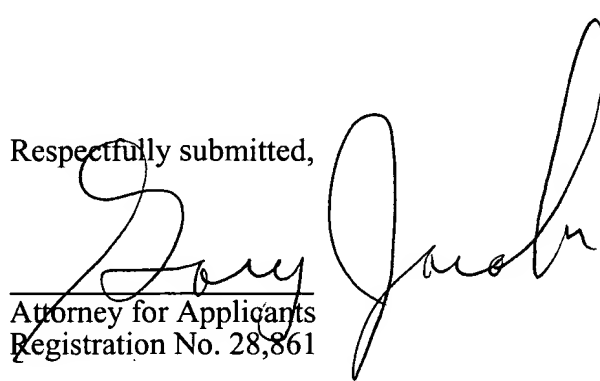
Response to substantive rejections

In response while not conceding the propriety of the rejections, independent Claims 12, 33, 56, and 58 have been canceled without prejudice, thereby obviating the rejection under 35 U.S.C. § 102(b) over U.S. Patent No. 5,923,918 (Nakagawa, et al.). In response to the rejection over the patent to Karakama, et al., Applicants intend to shortly file a certified translation of the priority document in this case, removing this patent as a reference, because the priority date of the present application precedes the publication date of the Karakama, et al. patent.

In view of the above amendments and remarks, withdrawal of the outstanding objections and rejections is respectfully solicited.

Applicants' undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should continue to be directed to our below-listed address.

Respectfully submitted,



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MARKED-UP AMENDED SPECIFICATION

Please substitute the following paragraph for the paragraph starting at page 2, line 9 and ending at line 23. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--In an electrophotographic image forming apparatus using the electrophotographic image forming process, use has been made [with] of the process cartridge type in which the process cartridge comprises as a unit the electrophotographic photosensitive member and process means actable on the electrophotographic photosensitive member, the unit being detachably mountable to the main assembly of the electrophotographic image forming apparatus. With the use of the process cartridge type apparatus, the maintenance operation can be carried out in effect by the users without the necessity of relying on serviceman, and therefore, the [operativity] operability is improved. Therefore, the process cartridge type apparatus is widely used in the field of electrophotographic image forming apparatus.--

Please substitute the following paragraph for the paragraph starting at page 2, line 24 and ending at page 3, line 2. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--With the electrophotographic image forming apparatus of such a process cartridge type, the user exchanges the cartridge by himself or herself. [The therefore] Therefore, there is provided a developer amount detecting means by which the user is notified of the shortage of the developer in the process cartridge[is notified to the user].--

Please substitute the following paragraph for the paragraph starting at page 3, line 3 and ending at line 10. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--As [an] a conventional example of the developer amount detecting means, there is a type in which two electrode rods are provided in the developer container of the developing means, and a change in the part between the two electrode rods to detect the presence or absence of the developer is detected. This is called a "yes-or- no type" device. Various systems of this type have been put into practice.--

Please substitute the following paragraph for the paragraph starting at page 3, line 11 and ending at line 17. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--Recently, it is desired that the remaining amount of the developer is detected continuously or substantially in real-time (real-time or [containers] continuous type) and such detection has been provided [is provided]. With this type of apparatus, the user can be notified of the remaining amount of the developer [can be notified to the user] substantially in real-time to facilitate exchanging of the process cartridge.--

Please substitute the following paragraph for the paragraph starting at page 3, line 20 and ending at line 24. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--Accordingly, it is a principal object of the present invention to provide a developing device, a process cartridge and an electrophotographic image forming apparatus wherein the remaining amount of the developer can be detected in substantially real-time.--

Please substitute the following paragraph for the paragraph starting at page 3, line 25 and ending at page 4, line 2. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--It is another object of the present invention to provide a developing device, a process cartridge and [a] an electrophotographic image forming apparatus wherein the remaining amount of the developer can be detected with precision.--

Please substitute the following paragraph for the paragraph starting at page 4, line 3 and ending at page 5, line 2. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--According to an aspect of the present invention, there is provided an electrophotographic image forming apparatus, a process cartridge and a developing device for developing an electrostatic latent image formed on an electrophotographic photosensitive member, [said] the developing device being usable with a main assembly of an electrophotographic image forming apparatus, [said] the developing device comprising[;]: a developing member for supplying a developer to the electrophotographic photosensitive member for developing the electrostatic latent image formed on [said] the electrophotographic photosensitive member; a first electrode provided opposed to the developing member; and a second electrode disposed such that at least a lower end thereof takes a position lower than [said] the first electrode when [said] the developing device is mounted to the main assembly of the electrophotographic image forming apparatus[; wherein an]. An [electric] electrical signal is generated in accordance with an electrostatic capacity between [said] the first electrode and second electrode when [said] the first electrode or second electrode is supplied with a voltage from the main assembly of [said] the electrophotographic image forming apparatus, and is measured by the main assembly of the electrophotographic image forming apparatus to detect a remaining amount of the developer.--

Please substitute the following paragraph for the paragraph starting at page 6, line 8 and ending at line 14. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--Figure 8 shows a relationship between the amount of the toner and the electrostatic capacity in the developer amount detecting means according to an embodiment of the present invention, wherein (a) shows a normal state, (b) shows too much developer in the recess, and (c) shows too long a period of time required for the developer to enter the recess.--

Please substitute the following paragraph for the paragraph starting at page 7, line 13 and ending at line 16. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--[Figures] Figure 17 illustrates changes in the amount of the toner and the electrostatic capacity (a) when a developing member is not used as a capacitor, and (b) when it is used as a capacitor.--

Please substitute the following paragraph for the paragraph starting at page 7, line 19 and ending at line 21. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--Figure 19 is a longitudinal sectional view of a major part of [a] an extended bent portion of the second electrodes.--

Please substitute the following paragraph for the paragraph starting at page 7, line 25 and ending at line 26. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--Figure 21 shows an example of the display of the amount of the remaining developer.--

Please substitute the following paragraph for the paragraph starting at page 7, line 27 and ending at page 8, line 1. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--Figure 22 shows another example of the display of the amount of the remaining developer.--

Please substitute the following paragraph for the paragraph starting at page 8, line 2 and ending at line 3. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--Figure 23 shows a further example of the display of the amount of the remaining developer.--

Please substitute the following paragraph for the paragraph starting at page 8, line 4 and ending at line 6. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--Figure 24 is a longitudinal sectional view of a further example of the display of the amount of the remaining developer.--

Please substitute the following paragraph for the paragraph starting at page 8, line 25 and ending at page 9, line 1. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--Figure 30 shows relationships between the toner amount and an electrostatic capacity in the developer amount detecting [divides] devices of each of Figures 19, 24 and 29.--

Please substitute the following paragraph for the paragraph starting at page 9, line 10 and ending at line 19. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--First, referring to Figures 1 - 3, an example of an electrophotographic image forming apparatus in which a process cartridge structured in accordance with the present invention is removably mountable will be described. In this embodiment, the electrophotographic image forming apparatus is an electrophotographic laser beam printer A, and forms an image on a recording medium, for example, a recording paper, an OHP sheet, a fabric, and the like, with the use of an electrophotographic image formation process.--

Please substitute the following paragraph for the paragraph starting at page 10, line 23 and ending at page 11, line 14. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--The development roller 9a contains a stationary magnet 9c. As the development roller 9a is rotated, the developer is borne on the development roller 9a and is carried in the rotational direction of the development roller 9a. As the development roller 9a is further rotated, the developer on the development roller 9a is [give] given triboelectrical charge by the development blade 9d while being formed into a developer layer with a predetermined thickness, and then is supplied to the development region of the photosensitive drum 7. As the developer is supplied to the development region, it is transferred onto the latent image on the photosensitive drum 7, forming a toner image. The development roller 9a is electrically connected to a development bias circuit, which applies development bias voltage to the development roller 9a. Normally, the development bias voltage is compound voltage, composed of AC voltage and DC voltage, applied to the development roller 9a.--

Please substitute the following paragraph for the paragraph starting at page 11, line 15 and ending at line 25. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--Meanwhile, a recording medium 2, for example, a piece of ordinary paper, having been placed in a sheet feeder cassette 3a, is conveyed to a transfer station by a pickup roller 3b, conveyer roller pairs 3c and 3d, and a registration roller pair 3e, in synchronism with the formation of the [tone] toner image. In the transfer station, a transfer roller 4 as a transferring means is positioned. As voltage is applied to the transfer roller 4, the toner image on the photosensitive drum 7 is transferred onto the recording medium 2.--

Please substitute the following paragraph for the paragraph starting at page 12, line 8 and ending at line 22. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--Thereafter, the recording medium is conveyed further, and is discharged into a delivery tray 6, through a reversing path 3j, by discharge roller pairs 3g, 3y, and 3i. The delivery tray 6 is located on top the main assembly 14 of the laser beam printer A, that is, an electrophotographic image forming apparatus. The pointing direction of a pivotal flapper 3k may be switched to discharge the recording medium 2 by a discharge roller pair 8m without passing the recording medium 2 through the reversing path 3j. In this embodiment, the aforementioned pickup roller 3b, the conveyer roller pairs 3c and 3d, the registration roller pair 3c, the conveyance guide 3f, the discharger roller pairs 3g, 3h, and 3i, and the discharge roller pair 3m, constitute a conveying means.--

Please substitute the following paragraph for the paragraph starting at page 12, line 23 and ending at page 13, line 9. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--Referring to Figure 3, in this embodiment, a process cartridge B is assembled in the following manner. First, the developer container 11 (developer holding portion) which has the developer stirring- conveying member 9b and holds developer, and the development chamber 9A which holds the developing means 9, are welded together to form a development unit, and then, the thus formed development unit is joined with a cleaning means container 13 in which the photosensitive drum 7, a cleaning means 10 comprising cleaning blade 10a and the like, and the charge roller 8, are attached. Incidentally, the developing means 9 comprises the development roller 9a, the development blade 9d, and the like.--

Please substitute the following paragraph for the paragraph starting at page 13, line 25 and ending at page 14, line 3. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--According to the present invention, the process cartridge B is provided with a developer amount detecting apparatus capable of continuously (substantially in real-time) detecting the amount of the developer remaining in the developer container 11, as the developer is consumed.--

Please substitute the following paragraph for the paragraph starting at page 15, line 4 and ending at line 11. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--Next, the movement of the developer, and the manner in which the amount of the developer [reduces] decreases, will be described, starting from a point in time prior to the shipment of the process cartridge, through the period in which the developer in a process cartridge is consumed after the mounting of the process cartridge into the main assembly 14 of the electrophotographic image forming apparatus.--

Please substitute the following paragraph for the paragraph starting at page 15, line 12 and ending at line 19. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--Referring to Figure 3, prior to the shipment of a process cartridge, a seal 30 for sealing the developer container 11 is pasted between the development chamber 9A and the developer container 11, as indicated by the dotted line in Figure 3, so that the developer is prevented from leaking outward due to the vibrations or the like which occur as the process cartridge is transported.--

Please substitute the following paragraph for the paragraph starting at page 17, line 2 and ending at line 4. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--(1) an upward force which affects the developer as the developer is sent into the development chamber 9A by the developer stirring-conveying member 9b;--

Please substitute the following paragraph for the paragraph starting at page 17, line 5 and ending at line 6. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--(2) a downward force which [generates] is generated due to the self-weight of the developer;--

Please substitute the following paragraph for the paragraph starting at page 17, line 7 and ending at line 12. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--(3) a force which works against the downward force (when a large amount of developer is present under the recess 80, it functions as a lid which covers the recess 80 from below, preventing the self-weight of the developer from causing the developer to descend from within the recess 80);--

Please substitute the following paragraph for the paragraph starting at page 17, line 13 and ending at line 15. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--(4) a force which results from the [lowness of the] low fluidity of the developer itself and works in a manner to hold the developer at its current position.--

Please substitute the following paragraph for the paragraph starting at page 17, line 26 and ending at page 18, line 10. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--As the usage of the process cartridge B continues, the amount of the developer in the adjacencies of the development roller 9a [reduces] decreases due to the developer consumption for development. However, the adjacencies of the development roller 9a [is] are continuously replenished with the developer from the developer container 11 by the function of the developer stirring-conveying member 9b. Thus, with the continuous usage of the process cartridge B, the amount of the developer within the developer container 11 [reduces] decreases, and the top surface of the developer mass within the developer container 11 descends.--

Please substitute the following paragraph for the paragraph starting at page 18, line 11 and ending at line 18. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--Referring to Figure 7, as the top surface of the developer mass within the developer container 11 descends in the order indicated by Figures 7(a), 7(b), 7(c), and 7(d), the forces (1) and (3) [reduce] decrease, allowing the amount of the developer between the first and second electrodes 81 and 82 to gradually [reduces] decrease. As a result, the electrostatic capacity between the two electrodes changes.--

Please substitute the following paragraph for the paragraph starting at page 18, line 19 and ending at page 19, line 17. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--Describing further Figure 7, Figure 7(a) shows a state of the interior of the developer container 11 when a sufficient amount of developer is present in the developer container 11, and the first and second electrodes 81 and 82 are within the developer mass. Figure 7(b) shows a state of the interior of the developer container 11 when the amount of the developer within the developer container 11 has slightly [reduced] decreased, and the top surface of the developer mass within the developer container 11 has descended to the same level as those of the bottom and top ends of the first and second electrodes 81 and 82, respectively. Figure 7(c) shows the a state of the interior of the developer container 11 when the amount of the developer has further [reduced] decreased to a level at which there is no developer in the recess 80, and the surface of the developer mass within the developer container 11 has dropped below the level of the bottom end of the first electrode 81, being approximately at the level of the center of the second electrode 82. Figure 7(d) shows a state of the interior of the developer container 11 when the amount of the developer in the developer container 11 has [reduced] decreased to a level at which the top surface of the developer mass within the developer container 11 barely touches the bottom end of the second electrode 82.--

Please substitute the following paragraph for the paragraph starting at page 19, line 18 and ending at line 25. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--The manner in which the electrostatic capacity value between the two electrodes 81 and 82 changes in response to the [of the] surface of the developer mass position (amount of developer remainder) within the developer container 11 is affected by the fluidity of the developer in use and the conveying performance of the developer stirring conveying member 9b.--

Please substitute the following paragraph for the paragraph starting at page 21, line 6 and ending at line 23. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--As described above, the electrostatic capacity between the first and second electrodes 81 and 82 changes in response to the developer distribution in the regions which affect the sensitivities of the first and second electrodes, that is, the toner distribution in the recess 80 and the adjacencies thereof. However, the developer within the recess 80 remains under the above described various forces (1) - (4), and therefore, there is a tendency that the value of the electrostatic capacity does not stabilize until the aforementioned four forces reach virtual equilibrium. In other words, the value of this electrostatic capacity between the two electrodes 81 and 82 shows some deviations if the developer temporarily enters the aforementioned regions by an [excessively] excessive amount, or if the entrance of the developer into the aforementioned regions lags.--

Please substitute the following paragraph for the paragraph starting at page 23, line 9 and ending at line 23. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--On the other hand, if the second electrode 82, that is, the electrode having a shorter distance from the development roller 9a, is extended so that its top end [reach] reaches the level of the top end of the recess 80, the distance between the first and second electrodes 81 and 82 within the recess 80 becomes too small, that is, small enough to raise the sensitivity of the aforementioned condenser to a level at which the condenser is capable of detecting the aforementioned fluctuation of the electrostatic capacity value, which occurs while the state of developer mass becomes stabilized. Therefore, the developer amount may not be accurately detected. Thus, it is not desirable to [extends] extend the second electrode 82 in the manner described above.--

Please substitute the following paragraph for the paragraph starting at page 24, line 21 and ending at page 25, line 2. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--In addition to the detecting method employing the above described structural arrangement, there are other detecting methods; for example, if a process cartridge is provided with a recording means, it is possible to record the print count, the duration of the process cartridge, and the like, so that the detection can be started for the first time after the [elapsing] elapse of a certain length of time which is thought to be needed for the aforementioned equilibrium to be realized.--

Please substitute the following paragraph for the paragraph starting at page 25, line 3 and ending at line 14. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--It is desired to improve the accuracy with which the developer remainder amount is continuously detected [is] to increase the amount of the change in the electrostatic capacity. More specifically, this objective can be accomplished by increasing the surface areas of the first and

second electrodes 81 and 82, by reducing the distance between the first and second electrodes 81 and 82, and/or by the like methods. In order to increase the surface areas of the electrodes, the electrodes may be corrugated as shown in Figure 10, or may be dimpled as shown in Figure 11.--

Please substitute the following paragraph for the paragraph starting at page 25, line 26 and ending at page 26, line 18. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--Referring to Figure 14, the detection accuracy can be improved by making the dimensions of the first and second electrodes 81 and 82 in terms of the longitudinal direction of the developer roller 9a virtually the same as the dimension of the image forming region in terms of the longitudinal direction. However, if the detection accuracy is less essential, electrodes smaller in dimension in terms of the longitudinal direction of the development roller 9a may be placed across the center or end portion of the image forming region to reduce the cost. In such a case, however, it is impossible to detect the developer distribution in terms of the longitudinal direction of the development roller 9a, and therefore, in order to compensate for such a problem, it is desired that a plurality of electrodes smaller in the dimension in terms of the longitudinal direction of development roller 9a are strategically distributed across the image forming region, for example, at both ends, the center, and the like, as shown in Figure 15.--

Please substitute the following paragraph for the paragraph starting at page 27, line 12 and ending at line 25. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--Figure 17 shows typical changes in electrostatic capacity; Figures 17(b) and 17(a) show the cases in which the development roller 9a was caused to, and not caused to, double as one of the condenser electrodes, respectively. It is evident that the magnitude of the change in the

electrostatic capacity, which occurs in response to the change (amount of consumption) in the amount of toner in terms of a toner unit as the developer remainder amount nearly [reduces] decreases to the level at which the formation of an image with abnormal white spots begins, was far greater, in other words, the detection accuracy was far better, in the case represented by Figure 17(b) than that in the case represented by Figure 17(a).--

Please substitute the following paragraph for the paragraph starting at page 27, line 26 and ending at page 28, line 10. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--The reason for the occurrence of a larger change in the electrostatic capacity relative to the change (consumption) in the toner amount in terms of the toner unit, immediately before the beginning of the period in which images with abnormal white spots occur, is that the abnormal white spots begin to be created as the amount of the toner on the peripheral surface of the development roller 9a begins to decrease. Therefore, measuring the amount of the developer on the peripheral surface of the development roller 9a as accurately as possible is one of the essential requirements for improving the detection accuracy.--

Please substitute the following paragraph for the paragraph starting at page 28, line 11 and ending at line 22. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--It becomes possible to raise the “detection sensitivity” in the adjacencies of the development roller 9a by making the above described structural arrangement, in which the development roller 9a is made to double as one of the pair of electrodes in the aforementioned second condenser, while placing the second electrode 82, which functions as the counterpart to the development roller 9a, in the adjacencies of the development roller 9a. The difference in

detection accuracy between Figures 17(a) and 17(b) was created by such a structural arrangement.--

Please substitute the following paragraph for the paragraph starting at page 29, line 22 and ending at page 30, line 2. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--The above described third electrode 83 does not need to be a part of the second electrode 82. In other words, even if the third electrode 83 is independent from the second electrode 82, it does not matter as far as the threshold developer level detection accuracy is concerned. In such a case, the third electrode 83 may be constituted of a piece of a round rod [instead] instead of a piece of a metallic plate.--

Please substitute the following paragraph for the paragraph starting at page 32, line 6 and ending at line 13. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--As for the electrode material, as long as the electrodes 81, 82, and 83 are formed of an electrically conductive substance, their functions remain similar to those described above. However, in this embodiment, a nonmagnetic metallic substance, for example, nonmagnetic SUS, was used as the electrode material to prevent the electrodes from interfering with developer circulation.--

Please substitute the following paragraph for the paragraph starting at page 33, line 4 and ending at line 11. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--Next, referring to Figure 20, a developer amount detecting apparatus as an embodiment of the principle of the present invention will be described. Figure 20 [is] shows how

the developer roller 9a and the first and second electrodes 81 and 82 within the process cartridge B are connected to a developer amount detection circuit 100 on the image forming apparatus main assembly side.--

Please substitute the following paragraph for the paragraph starting at page 33, line 26 and ending at page 34, line 4. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--The development bias circuit 101 is connected to a [referential] reference capacity member 88 of the control circuit 102. A [referential] reference voltage V1 for detecting the developer remainder amount is set using an AC current I1 supplied from the development bias circuit 101.--

Please substitute the following paragraph for the paragraph starting at page 34, line 5 and ending at line 11. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--The control circuit 102 sets the [referential] reference voltage V1 by adding a voltage drop V2 caused by the combination of an AC current I11 created by shunting the AC current I1 supplied to the [referential] reference capacity member 88, that is, an impedance element, at a volume VR1, and a resistor R2, to a voltage V3 set by resistors R3 and R4.--

Please substitute the following paragraph for the paragraph starting at page 35, line 17 and ending at page 36, line 4. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--It is difficult to [designing] design a process cartridge in which a pair of electrically conductive members are positioned inside the developer container, because such a design affords only a small amount of latitude in terms of the location, the shape, and the size of the conductive

members. However, such a design makes it possible to reduce the distance between the pair of electrodes to a level which the conventional structural arrangement cannot match. Further, such a design makes it possible to place the pair of electrically conductive members in the adjacencies of the developing member, and therefore, it can improve the accuracy with which the threshold developer level below which images with abnormal white spots are formed is detected.--

Please substitute the following paragraph for the paragraph starting at page 36, line 5 and ending at line 21. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--To describe the method for displaying the developer remainder amount, for example, there are a method in which the information detected by the above described developer amount detecting apparatus is directly displayed in the form of numerical value (for example, "10 %") on the screen 45 of a monitor of a personal computer 44 of a user as shown in Figure 21, or [a] the methods illustrated in Figures 22(a) and 22(b). In the cases of the methods illustrated in Figures 22(a) and 22(b), a user is informed of the developer remainder amount by the point of a gauge 42 pointed by a hand 41 which moves in proportion to the developer amount. Also, [a] the electrophotographic image forming apparatus main assembly may be provided with an indicator section 43, which employs LEDs or the like which are turned on or off in a manner to reflect the developer amount.--

Please substitute the following paragraph for the paragraph starting at page 40, line 2 and ending at page 41, line 11. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--Thus, when it is necessary to increase the detection sensitivity to the threshold developer level, it is possible to employ an additional element such as the third electrode 83 in the first embodiment. However, in order to increase the sensitivity of the developer amount

detecting apparatus, in the bottom portion of the development chamber 9A, a rod electrode 87 as an intermediary electrode, which extends across the entire longitudinal range of the development roller 9a, in parallel to the development roller 9a and developer path electrode 84, as shown in Figure 25, may be provided. With this arrangement, the developer path electrode 84 and rod electrode 87 serve as two electrodes of a condenser; in other words, the distance between the two electrodes of a condenser becomes smaller, increasing the detection sensitivity. More specifically, the intermediary electrode 87 is provided; the development roller 9a and third electrode 83 are equalized in potential level, and connected to the development bias circuit 101 as a development bias applying means; and the intermediary electrode 87 is connected to the control circuit 102 of the developer amount detection circuit 100. Therefore, the sensitivity with which the developer remainder amount is detected, and the sensitivity with which the threshold developer level is detected, are raised without inviting a drastic cost increase. Further, with this structural arrangement, the electrostatic capacity changes in response to the decrease in the developer remainder amount as indicated by the graph in Figure 28. The selection of the structural arrangement for a process cartridge B does not need to be limited to those described above. As a matter of fact it does not matter where the electrodes are placed, as long as the sensitivity with which developer presence is detected can be improved.--

MARKED-UP AMENDED ABSTRACT

Please amend the Abstract as follows:

--A developing device [for developing an electrostatic latent image formed on an electrophotographic photosensitive member, the developing device being] usable with a main assembly of an electrophotographic image forming apparatus [, the developing device] includes a developing member for supplying a developer to [the] an electrophotographic photosensitive member for developing [the] an electrostatic latent image formed on the electrophotographic photosensitive member[;], a first electrode [provided opposed to developing member;], and a second electrode [disposed such that at least a lower end thereof takes a position lower than the first electrode when the developing device is mounted to the main assembly of the electrophotographic image forming apparatus;]. [wherein an electric] An electrical signal is generated in accordance with an electrostatic capacity between the first electrode and second electrode when the first electrode or the second electrode is supplied with a voltage from the main assembly of the electrophotographic image forming apparatus, and is measured by the main assembly of the electrophotographic image forming apparatus to detect a remaining amount of the developer.--.

MARKED-UP AMENDED CLAIMS

1. (Twice Amended) A developing device for developing an electrostatic latent image formed on an electrophotographic photosensitive member, said developing device being usable with a main assembly of an electrophotographic image forming apparatus, said developing device comprising:

a developing member for supplying a developer to the electrophotographic photosensitive member for developing the electrostatic latent image formed on said electrophotographic photosensitive member;

a first electrode [provided opposed to] disposed along a length of said developing member; and

a second electrode disposed such that at least a lower end thereof takes a position [lower] above [than] said first electrode when said developing device is mounted to the main assembly of the electrophotographic image forming apparatus, wherein said second electrode is disposed along a length of said developing member;

wherein an [electric] electrical signal is generated in accordance with an electrostatic capacity between said first electrode and second electrode when said first electrode or second electrode is supplied with a voltage from the main assembly of said electrophotographic image forming apparatus, and is measured by the main assembly of the electrophotographic image forming apparatus to detect a remaining amount of the developer.

3. (Amended) A device according to Claim 1 [or 2], wherein said [first] second electrode and a frame supporting said [second] first electrode constitute a recess extending parallel to [said] a developing device frame, wherein said recess opens [opening] downward.

5. (Amended) A device according to Claim [1 or 2] 3, wherein one and the other of said first and second electrodes are plate-like and rod-like electrodes.

6. (Twice Amended) A developing device for developing an electrostatic latent image formed on an electrophotographic photosensitive member, said developing device being usable with a main assembly of an electrophotographic image forming apparatus, said developing device comprising:

a developing member for supplying a developer to said electrophotographic photosensitive member to develop the electrostatic latent image formed on said electrophotographic photosensitive member;

a first electrode [disposed opposed to] disposed along a length of said developing member;

a second electrode disposed such that at least a lower end thereof takes a position [lower] above [than] said first electrode when said developing device is mounted to the main assembly of the electrophotographic image forming apparatus, wherein said second electrode is disposed along a length of said developing member;

a third electrode disposed between said [second] first electrode and said developing member;

a first electrical contact for receiving, from the main assembly of said electrophotographic image forming apparatus, a voltage to be applied to said first electrode when said developing device is mounted to the main assembly of said electrophotographic image forming apparatus;

a second electrical contact for receiving, from the main assembly of said electrophotographic image forming apparatus, a voltage to be applied to [send] said developing member when said developing device is mounted to the main assembly of said electrophotographic image forming apparatus; and

a third electrical contact for transmitting, to the main assembly of said electrophotographic image forming apparatus, an [electric] electrical signal corresponding at least to electrostatic capacities between said first electrode and second electrode and between

said developing member and said third electrode, when the voltages are applied to said first electrode and to said developing member, to detect a remaining amount of the developer by the main assembly of the electrophotographic image forming apparatus.

8. (Twice Amended) A device according to Claim 6 [or 7], wherein said [first] second electrode and a frame supporting said [second] first electrode constitute a recess extending parallel to said developing member, [and] said recess opening downward.

9. (Twice Amended) A device according to Claim 6 or [7] 8, wherein said third electrode is a member which is integral with or separate from said [second] first electrode, and is disposed along a length of [opposed to] said developing member.

10. (Twice Amended) A device according to [any one of Claims 6 and 7] Claim 9, further comprising a developer chamber having an opening in which said developing member is supported, and a developer container, connected with said developer chamber, for accommodating the developer, wherein said first, second and third electrodes are provided in said developer chamber.

11. (Twice Amended) A device according to [any one of Claims 1, 2, 6, and 7] Claim 1 or 6, further comprising developer stirring means for stirring the developer, wherein at least said first and second electrodes are disposed in a moving range of the developer provided by rotation of said developer stirring means.

13. (Twice Amended) A developing device for developing an electrostatic latent image formed on an electrophotographic photosensitive member, said developing device being

usable with a main assembly of an electrophotographic image forming apparatus, said developing device comprising:

a developing member for supplying a developer to said electrophotographic photosensitive member to develop the electrostatic latent image formed on said electrophotographic photosensitive member;

a first electrode provided so as to exhibit the same potential as said developing member;

a second electrode disposed such that at least a lower end thereof takes a position [lower] above [than] said first electrode when said developing device is mounted to the main assembly of the electrophotographic image forming apparatus;

a developer path electrode disposed along a path along which the developer accommodated in [said] a developer accommodating portion moves to said developing member;

a first electrical contact for receiving, from the main assembly of said electrophotographic image forming apparatus, a voltage to be applied to said first electrode when said developing device is mounted to the main assembly of said electrophotographic image forming apparatus;

a second electric contact for receiving, from the main assembly of said electrophotographic image forming apparatus, a voltage to be applied to said developing member when said developing device is mounted to the main assembly of said electrophotographic image forming apparatus; and

a third electrical contact for transmitting, to the main assembly of the electrophotographic image forming apparatus, an [electric] electrical signal corresponding to electrostatic capacities at least between said first electrode and said second electrode and between said developing member and said developer path electrode to detect a remaining amount of the developer by the main assembly of the electrophotographic image forming apparatus.

14. (Amended) A device according to Claim [12 or] 13, wherein said developer path electrode is in the form of a plate extending along the path.

15. (Amended) A device according to Claim 13, further comprising a third electrode provided between said first [second] electrode and said [second electrode and said] developing member.

16. (Amended) A device according to Claim 15, wherein said third electrode is a member which is integral with or separate from said [second] first electrode, and is disposed [opposed to] along a length of said developing member.

17. (Twice Amended) A device according to [any one of Claims 13, 15, and 16] Claim 13 or 16, wherein said first electrode and said second electrode are arranged along a length of said developing member which is in the form of a developing roller.

18. (Twice Amended) A device according to [any one of Claims 13, 15, and 16] Claim 13, wherein said [first] second electrode and a frame supporting said [second] first electrode constitute a recess extending parallel to said developing member, [and] said recess opening downward.

19. (Twice Amended) A device according to [any one of Claims 13, 15, and 16] Claim 13, further comprising [and] an intermediary electrode between said developing member and said developer path electrode.

20. (Twice Amended) A device according to [any one of Claims 15 and 16] Claim 13 or 16, further comprising developer stirring means for stirring the developer, wherein at least said

first electrode and second electrode are disposed in a moving range of the developer provided by rotation of said developer stirring means.

21. (Amended) A device according to [any one of Claims] Claim 1, 6 or 13, further comprising a stirring member for stirring the developer accommodated therein, wherein at least a lower end of said second electrode takes a position [lower] above [than] said first electrode in a direction of movement of the developer provided by said stirring member, when said developing device is mounted to the main assembly of the electrophotographic image forming apparatus.

22. (Twice Amended) A process cartridge detachably mountable to a main assembly of an electrophotographic image forming apparatus, comprising:

(a) an electrophotographic photosensitive member;

(b) a developing device including[;];

a developing member for supplying a developer to said electrophotographic photosensitive member to develop [the] an electrostatic latent image formed on said electrophotographic photosensitive member;

a first electrode disposed [opposed to] along a length of said developing member; and

a second electrode disposed such that at least a lower end thereof takes a position [lower] above [than] said first electrode when said process cartridge is mounted to the main assembly of the electrophotographic image forming apparatus, wherein said second electrode is disposed along a length of said developing member.

wherein an [electric] electrical signal is generated in accordance with an electrostatic capacity between said first electrode and second electrode when said first electrode or second electrode is supplied with a voltage from the main assembly of said electrophotographic image forming apparatus, and is measured by the main assembly of the electrophotographic image forming apparatus to detect a remaining amount of the developer.

24. (Twice Amended) A process cartridge according to Claim 22 [or 23], wherein said first electrode and a frame supporting said second electrode constitute a recess extending parallel to [said] a developing device frame, said recess opening downward.

26. (Amended) A process cartridge according to Claim 22 or [23] 24, wherein one and the other of said first and second electrodes are plate-like and rod-like electrodes.

27. (Twice Amended) A process cartridge detachably mountable to a main assembly of an electrophotographic image forming apparatus, comprising:

(a) an electrophotographic photosensitive member;

(b) a developing device including:

a developing member for supplying a developer to said electrophotographic photosensitive member to develop [the] an electrostatic latent image formed on said electrophotographic photosensitive member;

a first electrode disposed [opposed to] along a length of said developing member;

a second electrode disposed such that at least a lower end thereof takes a position [lower] above [than] said first electrode when said process cartridge is mounted to the main assembly of the electrophotographic image forming apparatus, wherein said second electrode is disposed along a length said developing member;

a third electrode disposed between said [second] first electrode and said developing member;

a first electrical contact for receiving, from the main assembly of said electrophotographic image forming apparatus, a voltage to be applied to said first electrode when said process cartridge is mounted to the main assembly of said electrophotographic image forming apparatus;

a second electrical contact for receiving, from the main assembly of said electrophotographic image forming apparatus, a voltage to be applied to [send] said developing member when said process cartridge is mounted to the main assembly of said electrophotographic image forming apparatus; and

a third electrical contact for transmitting, to the main assembly of said electrophotographic image forming apparatus, an [electric] electrical signal corresponding at least to electrostatic capacities between said first electrode and second electrode and between said developing member and said third electrode, when the voltages are applied to said first electrode and to said developing member, to detect a remaining amount of the developer by the main assembly of the electrophotographic image forming apparatus.

29. (Twice Amended) A process cartridge according to Claim 27 [or 28], wherein said first electrode and a frame supporting said second electrode constitute a recess extending parallel to [said] a developing device frame, said recess opening downward.

30. (Twice Amended) A process cartridge according to Claim 27 or [28] 29, wherein said third electrode is a member which is integral with or separate from said second electrode, and is disposed opposed to said developing member.

31. (Twice Amended) A process cartridge according to [any one of Claims 27 and 28] Claim 30, further comprising a developer chamber having an opening in which said developing member is supported, and a developer container, connected with said developer chamber, for accommodating the developer, wherein said first, second and third electrodes are provided in said developer chamber.

32. (Twice Amended) A process cartridge according to [any one of Claims 22, 23, 27, and 28] Claim 27 or 29, further comprising developer stirring means for stirring the developer, wherein at least said first and second electrodes are disposed in a moving range of the developer provided by rotation of said developer stirring means.

34. (Amended) A process cartridge detachably mountable to a main assembly of an electrophotographic image forming apparatus, comprising:

(a) an electrophotographic photosensitive member; and

(b) a developing device including:

a developing member for supplying a developer to said electrophotographic photosensitive member to develop [the] an electrostatic latent image formed on said electrophotographic photosensitive member;

a first electrode provided so as to exhibit the same potential as said developing member;

a second electrode disposed such that at least a lower end thereof takes a position [lower] above [than] said first electrode when said [developing device] process cartridge is mounted to the main assembly of the electrophotographic image forming apparatus;

a developer path electrode disposed along a path along which the developer accommodated in [said] a developer accommodating portion moves to said developing member;

a first electrical contact for receiving, from the main assembly of said electrophotographic image forming apparatus, a voltage to be applied to said first electrode when said process cartridge is mounted to the main assembly of said electrophotographic image forming apparatus;

a second [electric] electrical contact for receiving, from the main assembly of said electrophotographic image forming apparatus, a voltage to be applied to said developing member

when said process cartridge is mounted to the main assembly of said electrophotographic image forming apparatus; and

a third electrical contact for transmitting, to the main assembly of the electrophotographic image forming apparatus, an [electric] electrical signal corresponding to electrostatic capacities at least between said first electrode and said second electrode and between said developing member and said developer path electrode to detect a remaining amount of the developer by the main assembly of the electrophotographic image forming apparatus.

35. (Amended) A process cartridge according to Claim [33 or] 34, wherein said developer path electrode is in the form of a plate extending along the path.

36. (Amended) A process cartridge according to Claim 34, further comprising a third electrode provided between said [second] first electrode [said second electrode] and said developing member.

37. (Twice Amended) A process cartridge according to Claim 36, wherein said third electrode is a member which is integral with or separate from said [second] first electrode, and is disposed [opposed to] along a length of said developing member .

38. (Twice Amended) A process cartridge according to [any one of Claims 33, 34, 36, and 37] Claim 34 or 37, wherein said first electrode and said second electrode are arranged along a length of said developing member which is in the form of a developing roller.

39. (Twice Amended) A process cartridge according to [any one of Claims 33, 34, 36, and 37] Claim 34 or 37, wherein said [first] second electrode and a frame supporting said

[second] first electrode constitute a recess extending parallel to said developing member, and wherein said recess [opening] opens downward.

40. (Twice Amended) A process cartridge according to [any one of Claims 33, 34, 36, and 37] Claim 34, further comprising an intermediary electrode between said developing member and said developer path electrode.

41. (Twice Amended) A process cartridge according to [any one of Claims 34, 36, and 37] Claim 34 or 37, further comprising developer stirring means for stirring the developer, wherein at least said first and second electrodes are disposed in a moving range of the developer provided by rotation of said developer stirring means.

42. (Amended) A process cartridge according to [any one of Claims] Claim 22, 27 or 34, further comprising [further comprising] a stirring member for stirring the developer accommodated therein, wherein at least a lower end of said second electrode takes a position [lower] above [than] said first electrode in a direction of movement of the developer provided by said stirring member, when said developing device is mounted to the main assembly of the electrophotographic image forming apparatus.

43. (Twice Amended) An electrophotographic image forming apparatus for forming an image on a recording material, comprising:

- (a) an electrophotographic photosensitive member;
- (b) an electrostatic latent image forming means for forming an electrostatic latent image on said electrophotographic photosensitive member; and
- (c) a developing device for developing [an] the electrostatic latent image formed on said electrophotographic photosensitive member, said developing device including:

a developing member for supplying the developer to said electrophotographic photosensitive member;

a first electrode disposed [opposed to] along a length of said developing member; and
a second electrode disposed such that at least a lower end thereof takes a position [lower] above [than] said first electrode when said developing device is mounted to a main assembly of the electrophotographic image forming apparatus, wherein said second electrode is disposed along a length of said developing member;

wherein an [electric] electrical signal is generated in accordance with an electrostatic capacity between said first electrode and second electrode when said first electrode or second electrode is supplied with a voltage from the main assembly of said electrophotographic image forming apparatus, and is measured by the main assembly of the electrophotographic image forming apparatus to detect a remaining amount of the developer.

44. (Twice Amended) An electrophotographic image forming apparatus for forming an image on a recording material, wherein a process cartridge is detachably mountable to a main assembly of said electrophotographic image forming apparatus, said electrophotographic image forming apparatus comprising:

(a) [an electrophotographic photosensitive member;
(b)] mounting means for mounting the process cartridge, said process cartridge including:

an electrophotographic photosensitive member;

a developing member for supplying a developer to said electrophotographic photosensitive member to develop an electrostatic latent image formed on said electrophotographic photosensitive member;

a first electrode disposed [opposed to] along a length of said developing member; and

a second electrode disposed such that at least a lower end thereof takes a position [lower] above [than] said first electrode when said process cartridge [developing device] is mounted to the main assembly of the electrophotographic image forming apparatus, wherein said second electrode is disposed along a length of said developing member;

[(c)] (b) electrostatic latent image forming means for forming the electrostatic latent image on said electrophotographic photosensitive member; and

[(d)] (c) developer remaining amount detecting means for detecting a remaining amount of the developer by measuring an [electric] electrical signal which is produced by application of a voltage to said first electrode or second electrode and which corresponds to an electrostatic capacity between said first electrode and second electrode.

46. (Twice Amended) A apparatus according to Claim 43 or 44, wherein said [first] second electrode and a frame supporting said [second] first electrode constitute a recess extending parallel to [said] a developing device frame, said recess opening downward.

49. (Twice Amended) An electrophotographic image forming apparatus for forming an image on a recording material, comprising:

(a) an electrophotographic photosensitive member;

(b) an electrostatic latent image forming means for forming an electrostatic latent image on said electrophotographic photosensitive member;

(c) a developing device for developing the electrostatic latent image formed on said electrophotographic photosensitive member, said developing device including:

a developing member for supplying a developer to said electrophotographic photosensitive member to develop the electrostatic latent image formed on said electrophotographic photosensitive member;

a first electrode disposed [opposed to] along a length of said developing member;

a second electrode disposed such that at least a lower end thereof takes a position [lower] above [than] said first electrode when said developing device is mounted to [the] a main assembly of the electrophotographic image forming apparatus, wherein said second electrode is disposed along a length of said developing member;

a third electrode disposed between said [second] first electrode and said developing member;

a first electrical contact for receiving, from the main assembly of said electrophotographic image forming apparatus, a voltage to be applied to said first electrode when said developing device is mounted to the main assembly of said electrophotographic image forming apparatus;

a second electrical contact for receiving, from the main assembly of said electrophotographic image forming apparatus, a voltage to be applied to [send] said developing member when said developing device is mounted to the main assembly of said electrophotographic image forming apparatus; and

a third electrical contact for transmitting, to the main assembly of said electrophotographic image forming apparatus, an [electric] electrical signal corresponding at least to electrostatic capacities between said first electrode and second electrode and between said developing member and said third electrode, when the voltages are applied to said first electrode and to said developing member; and

(d) developer amount detecting means for detecting an amount of the developer in said developing device on the basis of the [electric] electrical signal transmitted from said third [electric] electrical contact.

50. (Twice Amended) An electrophotographic image forming apparatus for forming an image on a recording material, wherein a process cartridge is detachably mountable to a main

assembly of said electrophotographic image forming apparatus, said electrophotographic image forming apparatus comprising:

(a) [an electrophotographic photosensitive member;

(b)] mounting means for detachably mounting the process cartridge, the process cartridge including:

an electrophotographic photosensitive member;

a developing member for supplying a developer to said electrophotographic photosensitive member to develop [the] an electrostatic latent image formed on said electrophotographic photosensitive member;

a first electrode disposed opposed to said developing member;

a second electrode disposed such that at least a lower end thereof takes a position lower than said first electrode when said process cartridge [developing device] is mounted to the main assembly of the electrophotographic image forming apparatus;

a third electrode disposed between said second electrode and said developing member;

a first electrical contact for receiving, from the main assembly of said electrophotographic image forming apparatus, a voltage to be applied to said first electrode when said developing device is mounted to the main assembly of said electrophotographic image forming apparatus;

a second electrical contact for receiving, from the main assembly of said electrophotographic image forming apparatus, a voltage to be applied to [send] said developing member when said developing device is mounted to the main assembly of said electrophotographic image forming apparatus; and

a third electrical contact for transmitting, to the main assembly of said electrophotographic image forming apparatus, an [electric] electrical signal corresponding at least to electrostatic capacities between said first electrode and second electrode and between said developing member and said third electrode, when the voltages are applied to said first

electrode and to said developing member, to detect a remaining amount of the developer by the main assembly of the electrophotographic image forming apparatus;

[(c)] (b) electrostatic latent image forming means for forming the electrostatic latent image on said electrophotographic photosensitive member; and

[(d)] (c) developer amount detecting means for detecting an amount of the developer in said [developing device] process cartridge on the basis of the [electric] electrical signal transmitted from said third [electric] electrical contact.

52. (Twice Amended) An apparatus according to Claim 49 or 50, wherein said [first] second electrode and a frame supporting said [second] first electrode constitute a recess extending parallel to said developing member, [and] said recess opening downward.

53. (Twice Amended) An apparatus according to Claim 49 or 50, wherein said third electrode is a member which is integral with or separate from said [second] first electrode, and is disposed [opposed to] along a length of said developing member.

54. (Twice Amended) An apparatus according to [any one of Claims] Claim 49 [and] or 50, further comprising a developer chamber having an opening in which said developing member is supported, and a developer container, connected with said developer chamber, for accommodating the developer, wherein said first, second and third electrodes are provided in said developer chamber.

55. (Twice Amended) An apparatus according to [any one of Claims 43, 44, 49, and 50] Claim 43, 44, 49 or 50, further comprising developer stirring means for stirring the developer, wherein at least said first and second electrodes are disposed in a moving range of the developer provided by rotation of said developer stirring means.

57. (Twice Amended) An electrophotographic image forming apparatus for forming an image on a recording material, comprising:

- (a) an electrophotographic photosensitive member[:];
- (b) an electrostatic latent image forming means for forming an electrostatic latent image on said electrophotographic photosensitive member;
- (c) a developing device for developing the electrostatic latent image formed on said electrophotographic photosensitive member, said developing device including[:];
 - a developing member for supplying a developer to said electrophotographic photosensitive member to develop the electrostatic latent image formed on said electrophotographic photosensitive member;
 - a first electrode provided so as to exhibit the same potential as said developing member;
 - a second electrode disposed such that at least a lower end thereof takes a position [lower] above [than] said first electrode when said developing device is mounted to [the] a main assembly of the electrophotographic image forming apparatus;
 - a developer path electrode disposed along a path along which the developer accommodated in [said] a developer accommodating portion moves to said developing member;
 - a first electrical contact for receiving, from the main assembly of said electrophotographic image forming apparatus, a voltage to be applied to said first electrode when said developing device is mounted to the main assembly of said electrophotographic image forming apparatus;
 - a second [electric] electrical contact for receiving, from the main assembly of said electrophotographic image forming apparatus, a voltage to be applied to said developing member when said developing device is mounted to the main assembly of said electrophotographic image forming apparatus; and

a third electrical contact for transmitting, to the main assembly of the electrophotographic image forming apparatus, an [electric] electrical signal corresponding to electrostatic capacities at least between said first electrode and said second electrode and between said developing member and said developer path electrode to detect a remaining amount of the developer by the main assembly of the electrophotographic image forming apparatus.

59. (Twice Amended) An electrophotographic image forming apparatus for forming an image on a recording material, wherein a process cartridge is detachably mountable to a main assembly of said electrophotographic image forming apparatus, said electrophotographic image forming apparatus comprising:

(a) [an electrophotographic photosensitive member;
(b)] mounting means for detachably mounting the process cartridge, the process cartridge including:

an electrophotographic photosensitive member;

a developing member for supplying a developer to said electrophotographic photosensitive member to develop [the] an electrostatic latent image formed on said electrophotographic photosensitive member;

a first electrode provided so as to exhibit the same potential as said developing member;

a second electrode disposed such that at least a lower end thereof takes a position [lower] above [than] said first electrode when said [developing device] process cartridge is mounted to the main assembly of the electrophotographic image forming apparatus;

a developer path electrode disposed along a path along which the developer accommodated in [said] a developer accommodating portion moves to said developing member;

a first electrical contact for receiving, from the main assembly of said electrophotographic image forming apparatus, a voltage to be applied to said first electrode when

said developing device is mounted to the main assembly of said electrophotographic image forming apparatus;

a second [electric] electrical contact for receiving, from the main assembly of said electrophotographic image forming apparatus, a voltage to be applied to said developing member when said developing device is mounted to the main assembly of said electrophotographic image forming apparatus; and

a third electrical contact for transmitting, to the main assembly of the electrophotographic image forming apparatus, an [electric] electrical signal corresponding to electrostatic capacities at least between said first electrode and said second electrode and between said developing member and said developer path electrode to detect a remaining amount of the developer by the main assembly of the electrophotographic image forming apparatus;

(b) electrostatic latent image forming means for forming the electrostatic latent image on said electrophotographic photosensitive member; and

(c) developer amount detecting means for detecting an amount of the developer in said [developing device] process cartridge on the basis of the [electric] electrical signal transmitted from said third [electric] electrical contact.

60. (Amended) An apparatus according to [any one of Claims 56-59] Claim 57 or 59, wherein said developer path electrode is in the form of a plate extending along the path.

61. (Twice Amended) An apparatus according to [any one of Claims 56-59] Claim 57 or 59, further comprising a third electrode provided between said [second] first electrode and said [second electrode and said] developing member.

62. (Amended) An apparatus according to according to Claim 61, wherein said third electrode is a member which is integral with or separate from said [second] first electrode, and is disposed [opposed to] along a length of said developing member.

63. (Twice Amended) An apparatus according to [any one of Claims 56] Claim 57 or [-] 59, wherein said first electrode and said second electrode are arranged along a length of said developing member which is in the form of a developing roller.

64. (Twice Amended) An apparatus according to [any one of Claims 56-] Claim 57 or 59, wherein said [first] second electrode and a frame supporting said [second] first electrode constitute a recess extending parallel to said developing member, and wherein said recess [opening] opens downward.

65. (Twice Amended) An apparatus according to [any one of Claims 56-59] Claim 57 or 59, further comprising an intermediary electrode between said developing member and said developer path electrode.

66. (Twice Amended) An apparatus according to [any one of Claims 56-] Claim 57 or 59, further comprising developer stirring means for stirring the developer, wherein at least said first electrode and second electrode are disposed in a moving range of the developer provided by rotation of said developer stirring means.